Internal Use Only
website:http://biz.LGservice.com

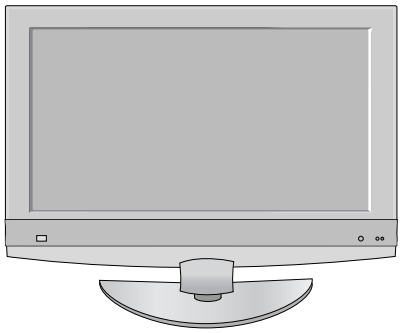
LCD TV
SERVICE MANUAL

CHASSIS : LP7BB

MODEL : 32LB9RTA/B/E

32LB9RTA/B/E-MB

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



CONTENTS

CONTENTS 2

SAFETY PRECAUTIONS 3

SPECIFICATION 6

ADJUSTMENT INSTRUCTION 10

TROUBLE SHOOTING 14

BLOCK DIAGRAM.....25

EXPLODED VIEW 26

EXPLODED VIEW PARTS LIST.....27

REPLACEMENT PARTS LIST 28

SVC. SHEET .....

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Replacement Parts List.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

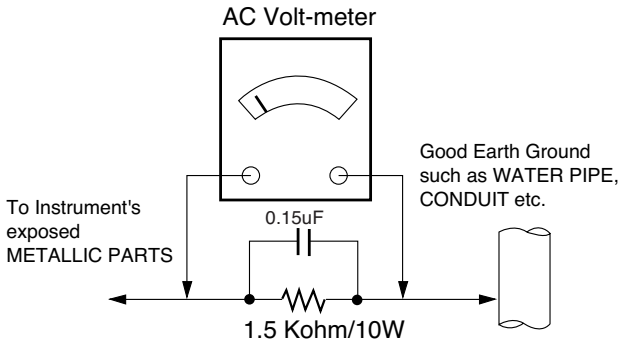
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1MΩ and 5.2MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



Replaceable batteries

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

ADVARSEL

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtening. Udskiftning má kun ske med batteri at samme fabrikat og type. Levér det brugte batteri tilbage til leverandoren

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the SAFETY PRECAUTIONS on page 3 of this publication.
NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
   b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
   CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe.
   Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)
   CAUTION: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.
   CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500°F to 600°F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle.
   Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
   a. Allow the soldering iron tip to reach normal temperature. (500°F to 600°F)
   b. Heat the component lead until the solder melts.
   c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach a normal temperature (500°F to 600°F)
   b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
   c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
   d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.
   CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This spec sheet is applied to the LCD TV used LP7BB chassis

2. Specification

Each part is tested as below without special appointment.

(1) Temperature : 25 ± 5°C(77 ± 9°F), CST : 40 ± 5°C
(2) Relative Humidity : 65% ± 10%
(3) Power Voltage : Standard input voltage (100-240V~, 50/60Hz)
*Standard Voltage of each products is marked by models
(4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
(5) The receiver must be operated for about 20 minutes prior to the adjustment.

3. Test method

(1) Performance : LGE TV test method followed
(2) Demanded other specification
Safety : CE, IEC Specification
EMC : CE, IEC

4. General TV Specification

No	Item	Specification		Remark
1.	Video input applicable system	NTSC-M, PAL M/N		
2.	Receivable Broadcasting System	1) NTSC 2) PAL M 3) PAL N		
3.	RF Input Channel	BAND	NTSC	
		VHF	2 ~ 13	
		UHF	14 ~ 69	
		CATV	1 ~ 125	
4.	Input Voltage	100-240V~ / 50Hz, 60Hz		
5.	Market	Central & South America		
6.	Operating Environment	1) Temp : 0 ~ 40 deg		
		2) Humidity : 10 ~ 90 %RH		
7.	Storage Environment	1) Temp : -20 ~ 50 deg		
		2) Humidity : 10 ~ 90 %RH		
8.	Power Consumption	Power on	≤ 260(42”)	
		(Green)	≤ 220(32”)	
9.	Stand by	Cool	≤ 1W(32”, 42”)	
		Warm	≤ 40W(32”, 42”)	When recordign the manual recording
10.	Frequency range	H : 31 ~ 61 khz V : 56 ~ 75 Hz		PC Input
11.	Video Input (2EA)	NTSC, PAL M/N		
12.	S-Video Input (1EA)	NTSC, PAL M/N		Side only
13.	Component Input (2EA)	Y/Cb/Cr, Y/Pb/Pr		
14.	RGB Input (1EA)	RGB-PC		
15.	HDMI Input (2EA)	HDMI-PC HDMI-DTV		
16.	Audio Input (5EA)	PC Audio, Component (2EA), AV(2EA)		L/R Input
17.	Audio variable out (1EA)			
18.	USB Input (1EA)	DivX, MP3, JPEG		
19.	AV out (1EA)			

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

5. General Module Specification

No	Item			Specification	Remark
1 .	Panel			42" TFT WXGA LCD	
				32" TFT WXGA LCD	
2.	LCD Module	Outline Dimension	42"	983 x 576 x 47.3	(H)mm x (V)mm x (D)mm
			32"	760.0 x 450.0 x 48.0	
		Pixel Pitch	42"	0.227 x 0.681 x RGB	mm
			32"	0.17025 x 0.51075 x RGB	
		Pixel Format		1366 x 768 Pixels RGB strip arrangement	
		Coating		Hard coating(3H), Anti-glare treatment of the front polarizer,	
		Back Light	42"	18CCFL	
			32"	18CCFL	

6. Set Optical Feature (LCD Module)

No	Item			Min	Typ	Max	Unit	Maker	Remark
1.	Luminance			400	500			LPL(0RT) 32",42"	- 50cm from the surface - Full White Pattern
2.	View angle (R/L, U/D)				178/178		degree	LPL 32”, 42”	- CR > 10
3.	White coordinate	White	X	-0.03	0.279/0.279/0.279	+0.03			
			Y		0.292/0.292/0.292				
		Red	X		0.635/0.636/0.635				
			Y		0.339/0.343/0.344				
		Green	X		0.282/0.284/0.286				
			Y		0.606/0.615/0.614				
		Blue	X		0.145/0.144/0.146				
			Y		0.064/0.063/0.061				
4.	Contrast ratio		CR	600	800			32"	LPL(0-RT)
				800	1000			42"	LPL(0-RT)
5.	Luminance Variation						1.3		

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

7. Component Video Input (Y, PB, PR)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Remarks
1.	720*480	15.73	59.94	13.500	SDTV, DVD 480I(525I)
	720*480	15.75	60.00	13.514	SDTV, DVD 480I(525I)
2.	720*576	15.625	50.00	13.500	SDTV, DVD 576I(625I)
3.	720*480	31.47	59.94	27.000	SDTV 480P
	720*480	31.50	60.00	27.027	SDTV 480P
4.	720*576	31.25	50.00	27.000	SDTV 576P
5.	1280*720	44.96	59.94	74.176	HDTV 720P
	1280*720	45.00	60.00	74.250	HDTV 720P
6.	1280*720	37.50	50.00	74.25	HDTV 720P 50Hz
7.	1920*1080	33.72	59.94	74.176	HDTV 1080I
	1920*1080	33.75	60.00	74.250	HDTV 1080I
8.	1920*1080	28.125	50.00	74.250	HDTV 1080I 50Hz,
9.	1920*1080	67.5	60.00	148.5	HDTV 1080P
10.	1920*1080	56.25	50	148.5	HDTV 1080P 50Hz

8. RGB Input (PC)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Remarks
1	720*400	31.469	70.08	28.32	DOS
2.	640*480	31.469	59.94	25.17	VESA(VGA)
3	640*480	37.500	75.00	31.50	VESA(VGA)
4	800*600	37.879	60.31	40.00	VESA(SVGA)
5	800*600	46.875	75.00	49.50	VESA(SVGA)
6	1024*768	48.363	60.00	65.00	VESA(XGA)
7	1024*768	56.476	70.06	78.75	VESA(XGA)
8	1024*768	60.023	75.02	79.50	VESA(XGA)
9	1280*768	47.776	59.87	80.125	WXGA(42XGA,50",60")
10	1360*768	47.712	60.01	85.50	WXGA(42XGA,50",60")
11	1366*768	47.700	60.00	84.62	WXGA(42XGA,50",60")

9. HDMI Input (PC)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Remarks
1	720*400	31.469	70.08	28.32	DOS
2	640*480	31.469	59.94	25.17	VESA(VGA)
3	640*480	37.500	75.00	31.50	VESA(VGA)
4	800*600	37.879	60.31	40.00	VESA(SVGA)
5	800*600	46.875	75.00	49.50	VESA(SVGA)
6	1024*768	48.363	60.00	65.00	VESA(XGA)
7	1024*768	56.476	70.06	75.00	VESA(XGA)
8	1024*768	60.023	75.02	78.75	VESA(XGA)
9	1280*768	47.776	59.87	79.50	WXGA(42XGA,50",60")
10	1360*768	47.712	60.01	85.50	WXGA(42XGA,50",60")
11	1366*768	47.700	60.00	84.62	WXGA(42XGA,50",60")

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

10. HDMI input (DTV)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Remarks
1.	720*480	31.47	59.94	27.000	SDTV 480P
2.	720*480	31.50	60.00	27.027	SDTV 480P
3.	720*576	31.25	50.00	27.000	SDTV 576P
4.	1280*720	44.96	59.94	74.176	HDTV 720P
5.	1280*720	45.00	60.00	74.250	HDTV 720P
6.	1280*720	37.50	50.00	74.25	HDTV 720P 50H
7.	1920*1080	33.72	59.94	74.176	HDTV 1080I
8.	1920*1080	33.75	60.00	74.250	HDTV 1080I
9.	1920*1080	28.125	50.00	74.250	HDTV 1080I 50Hz
10.	1920*1080	67.5	60.00	148.5	HDTV 1080P
11.	1920*1080	56.25	50	148.5	HDTV 1080P 50Hz

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

ADJUSTMENT INSTRUCTION

1. Application Range

This spec. sheet is applied to all of the LP7BB chassis (Saturn Analog DVR) manufactured at LG TV Plant all over the world.

2. Specification

2.1 Because this is not a hot chassis, it is not necessary to use an isolation transformer.
However, the use of isolation transformer will help to protect test instruments.
2.2 Adjustment must be done in the correct sequence.
2.3 The adjustment must be performed at 25±5°C temperature and 65±10% relative humidity if there is no specified designation.
2.4 The input voltage of the receiver must be kept between 100-220V, 50/60Hz.
2.5 Before adjustment, execute Heat-Run for 30 minutes at Full White mode.(Power on key)

3. PCB assembly adjustment items

* Channel memory
  - Download the channel data from BOM to EEPROM by using LGIDS.
* Option adjustment following BOM
  - Tool Option1
  - Tool Option2
  - Area Option

LP7BA LPL	42 Normal
S/W Version	X.XX
DVR Version	X.XX
UTT	XX hr
Tool Option1	7
Tool Option2	161
Area Option	16
:	

(Fig.1)

1) Push the ADJ key in the Adjust Remocon.
2) Input the Option Number that was specified in the BOM, into the Shipping area.
3) Select "Tool Option1/ Tool Option2/ Area Option" by using ▲/▼(CH+/-) key , and press the number key(0~9) consecutively
   ex) If the value of Tool Option1 is 7, input the data using number key "7" (Fig. 1)

4. SET assembly adjustment items

●Auto AV Color Balance

●Adjustment of White Balance

●Auto Component Color Balance adjustment
  - Standard equipment : MSPG925FA

●Auto RGB Color Balance adjustment
  - Standard equipment : MSPG925FA

(At DVR model Case, Please check DVR function like following list)

●Checking DVR Function and HDD

Check DVR Function as follow on 4.2 and find HDD failure under malfunction.

5. HDD Assembly Adjustment method

5.1. HDD FORMAT
1) Assemble MAIN , DVR Board.
2) HDD Format in progress words will create automatically.
3) Please, wait for 30~40 seconds.

5.1.1. HDD Format in progress

5.1.2. HDD Format completed

5.2. Sub Program Download for "DVR" by using USB memory stick
1) connect USB memory stick to SET
2) Set power off -> ON
  - DVR s/w will be installed automatically

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

6. EDID

● Caution

* Use the proper signal cable for EDID Download

- Analog EDID : Pin3 exists
- Digital EDID : Pin3 exists

=> Caution : - Never connect HDMI & DVI-D & DVI-A Cable at the same time.
- Use the proper cables below for EDID Writing

6.1. Data

6.1.1 ANALOG(256 Bytes)

● BLOCK1 (128BYTE)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a		b			
10	c															
20	11	49	4B	A5	6E	80	31	40	01	01	01	01	45	40	01	01
30	61	40	01	01	01	01	1B	21	50	A0	51	00	1E	30	48	88
40	35	00	BC	88	21	00	00	1C	4E	1F	00	80	51	00	1E	30
50	40	80	37	00	BC	88	21	00	00	18	00	00	00	FD	00	38
60	4B	1F	3D	09	00	0A	20	20	20	20	20	20	d			
70	d														00	e

6.1.2 HDMI(256 Bytes)

● BLOCK1 (128BYTE)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a		b			
10	c															
20	11	49	4B	A5	6E	80	31	40	01	01	01	01	45	40	01	01
30	61	40	01	01	01	01	1B	21	50	A0	51	00	1E	30	48	88
40	35	00	BC	88	21	00	00	1C	4E	1F	00	80	51	00	1E	30
50	40	80	37	00	BC	88	21	00	00	18	d					
60	d												00	00	00	FD
70	00	38	4B	1F	3D	09	00	0A	20	20	20	20	20	20	01	e

● BLOCK2 (128BYTE)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	24	F1	49	85	04	02	01	03	11	12	13	14	23	09
10	07	07	23	09	07	07	23	09	07	07	83	01	00	00	65	03
20	0C	00	10	00	01	1D	00	80	51	D0	1C	20	40	80	35	00
30	BC	88	21	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E
40	96	00	13	8E	21	00	00	18	2A	12	00	10	41	43	17	20
50	28	60	35	00	00	00	32	00	00	1C	01	1D	80	18	71	1C
60	16	20	58	2C	25	00	C4	8E	21	00	00	9E	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	6B

7. ADC Calibration

ADC	RF/AV/S-VIDEO			Component	RGB
MSPG925FA	PAL		NTSC	Model:217 720P	Model: 60
	INPUT SELECT	AV3-ZF AV1-TB	VIDEO1 -MA	Pattern:65	1024*768 60Hz
				* 100% Color Bar	Pattern: 65
	Model: 202 (PAL-BGDHI) Pattern: 65		Model:201 (NTSC) Pattern: 65		* 100% Color Bar
	* 100% Color Bar		* 100% Color Bar		

=> Caution : - System control RS-232 Host should be "PC" for adjustment.

Press the FRONT-AV KEY on R/C for converting input mode.

(change RS-232 Host : pc, Band Rate : 115200bps)

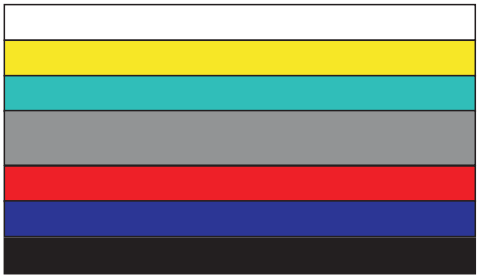
7.1 Adjustment of RF/AV/S-VIDEO

* Required Equipments

- Remote controller for adjustment
- 802F Pattern Generator, Master (MSPG-925FA), etc.
- MSPG-925FA Pattern Generator

(Which has Video Signal: 100% Color Bar Pattern shown in Fig. 2)

=> Model: 202 / Pattern : 65



(Fig. 2)

7.1.1 Method of Auto RF/AV/S-VIDEO Color Balance.

1) Press the FRONT-AV KEY on R/C for converting input mode.
2) Input the Video Signal: 100% Color Bar signal into AV
3) Set the PSM to Dynamic mode in the Picture menu.
4) Press INSTART key on R/C for adjustment.
5) Press the ▶(Vol. +) key to operate the set, then it becomes automatically
6) Auto-RGB OK means the adjustment is completed

7.1.2 Requirement

- This AV color balance adjustment should be performed before White Balance Adjustment.
- After AV color balance adjustment, Change the mode from AV to RF.

(Cancel Heat-run mode.)

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

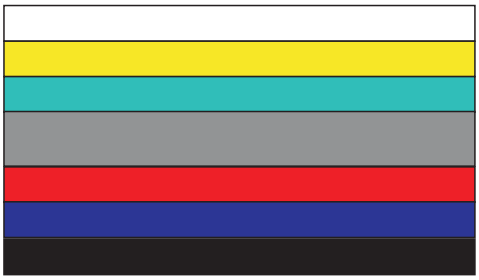
LGE Internal Use Only

7.2 Adjustment of Component.

* Required Equipments
- Remote controller for adjustment
- 802F Pattern Generator, Master (MSPG-925FA), etc
- MSPG-925FA Pattern Generator
  (Which has 720p@60Hz YPbPr signal : 100% Color Bar Pattern shown in Fig. 3)

=> Model: 217 / Pattern: 65

- It is very import to use correct adjustment pattern like Fig.3.
  a. Within the pattern, color sequence should be aligned : White-Yellow-Cyan-Green-Magenta-Red-BLUE-BLACK
  (If color sequence is reversed (Black -> …-> White), reverse the pattern with REV key, when using Master pattern generator like MSPG-925)
  b. If Minimum Black Level and/or Maximum White Level is not correct, Do select 100% Color Bar Pattern.



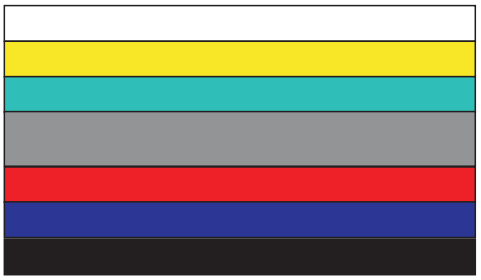
(Fig. 3)

7.2.1 Method of Auto Component Color Balance

1) Input the Component 720p 100% Color Bar(MSPG-925FA model:217, pattern:65) signal into Component.
   (MH : component 1)
2) Set the PSM to Dynamic mode in the Picture menu
3) Press the INSTART key on R/C for adjustment
4) Press the ▶(Vol. +) key to operate the set, then it becomes automatically
5) Auto-RGB OK means the adjustment is completed

7.3 Adjustment of RGB

* Required Equipments
- Remote controller for adjustment
- 802F Pattern Generator, Master (MSPG-925FA), etc
- MSPG-925FA Pattern Generator
  (Which has XGA [1024*768] 60Hz PC Format output signal : 100% Color Bar Pattern shown in Fig. 4)
- It is very import to use correct adjustment pattern like Fig. 4.
  a. Within the pattern, color sequence should be aligned : White-Yellow-Cyan-Green-Magenta-Red-BLUE-BLACK
  (If color sequence is reversed (Black -> …-> White), reverse the pattern with REV key, when using Master pattern generator like MSPG-925)
  b. If Minimum Black Level and/or Maximum White Level is not correct, Do select 100% Color Bar Pattern



(Fig. 4)

7.3.1 Method of Auto RGB Color Balance

1) Input the PC 1024x768 @ 60Hz with 100% color bar pattern like Fig.4. into RGB.
   (Ex. MSPG-925FA, model:60, pattern:65)
2) Set the PSM to Dynamic mode in Picture menu
3) Press the INSTART key on R/C for adjustment
4) Press the ▶(Vol. +) key operate To set , then it becomes automatically
5) Auto-RGB OK means adjustment is completed

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

8. White Balance

* Caution : Before White-balance, the AV ADC should be done.

=> Notice

- Do the white balance adjustment under the 10LUX
- Before white balance, press the In-start key 2times and do the reset like Fig.5
- Use the Torino inner pattern(216 gray pattern)
- To enter White-balance mode,press the IN-START key 2times.

* Caution : - System control RS-232 Host should be "PC" for adjustment.

White Balance(Hex)	
Color Temp.	Cool
Red Gain.	80
Green Gain.	80
Blue Gain.	80
Red Offset	80
Green Offset	80
Blue Offset	80
Reset	_ To set

(Fig. 4)

* Test Equipment

LCD : Color Analyzer (CA-110), PDP : Color Analyzer (CA-100)
CA-210 : The both of LCD and PDP are available.
PC (for communication through RS-232C) -> UART Baud rate : 115200
Pattern Generator (MSPG-925FA etc.)

* Color Temperature & Color Coordinates Setting

When adjusting the Color Temperature of LCD, Color AnalyzerCA-210(Matrix should be corrected through CH9 of CS-1000) should be used.
When adjusting the Color Temperature of PDP, Color AnalyzerCA-210(Matrix should be corrected through CH10 of CS-1000) should be used.
Adjust the Color Temperature based below adjustment color coordinates.
Even if CH9 of CA-210 is corrected with Matrix, there may be many character of Module and Filter.
Therefore Refer to the below Color Coordinates Target.
But, in case of WCG module, use the CH12 of CA-210.

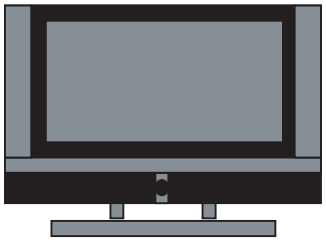
Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

TROUBLESHOOTING

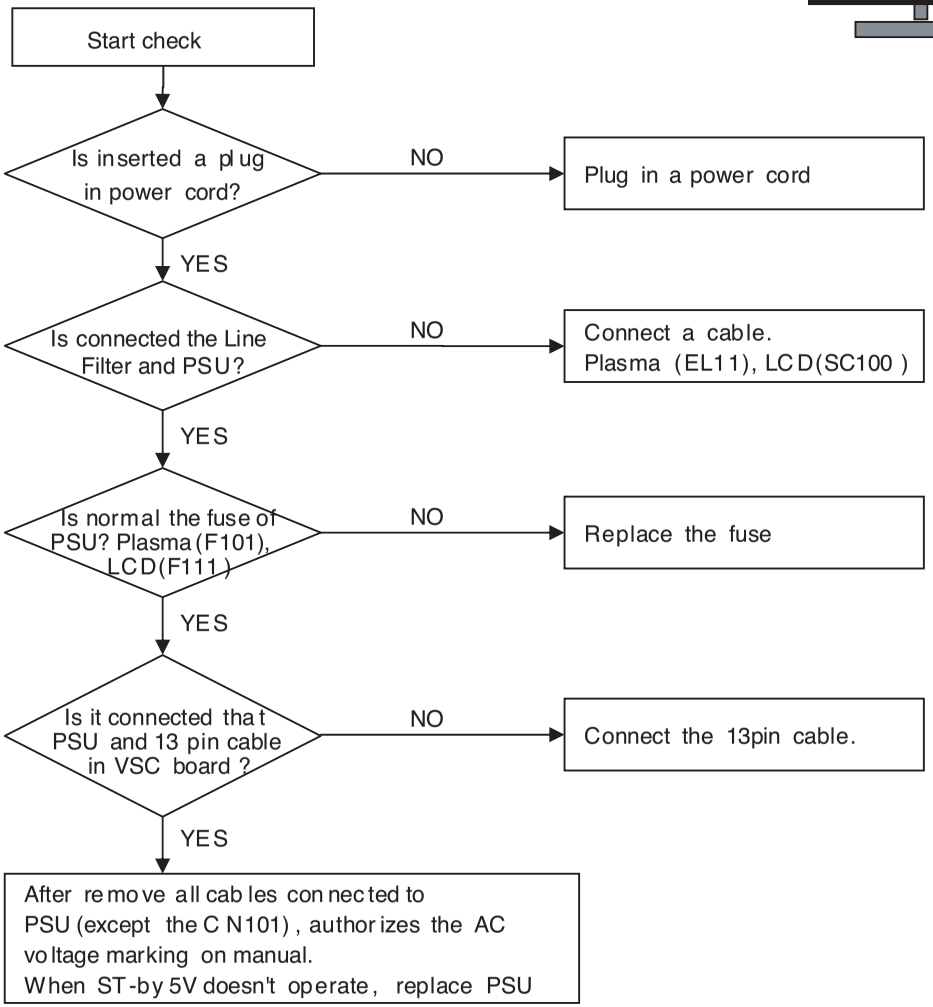
1. No power



◆ Symptom

1) Minute discharge doesn't occur at module.

2) Front LED doesn't come into action.


Start check
Is inserted a plug in power cord?
NO
Plug in a power cord
YES
Is connected the Line Filter and PSU?
NO
Connect a cable.
Plasma (EL11), LCD(SC100)
YES
Is normal the fuse of PSU? Plasma(F101), LCD(F111)
NO
Replace the fuse
YES
Is it connected that PSU and 13 pin cable in VSC board ?
NO
Connect the 13pin cable.
YES
After remove all cables connected to PSU (except the CN101), authorizes the AC voltage marking on manual.
When ST-by 5V doesn't operate, replace PSU

LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

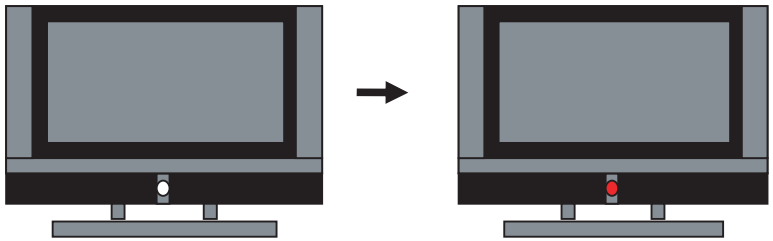
2. Protection mode

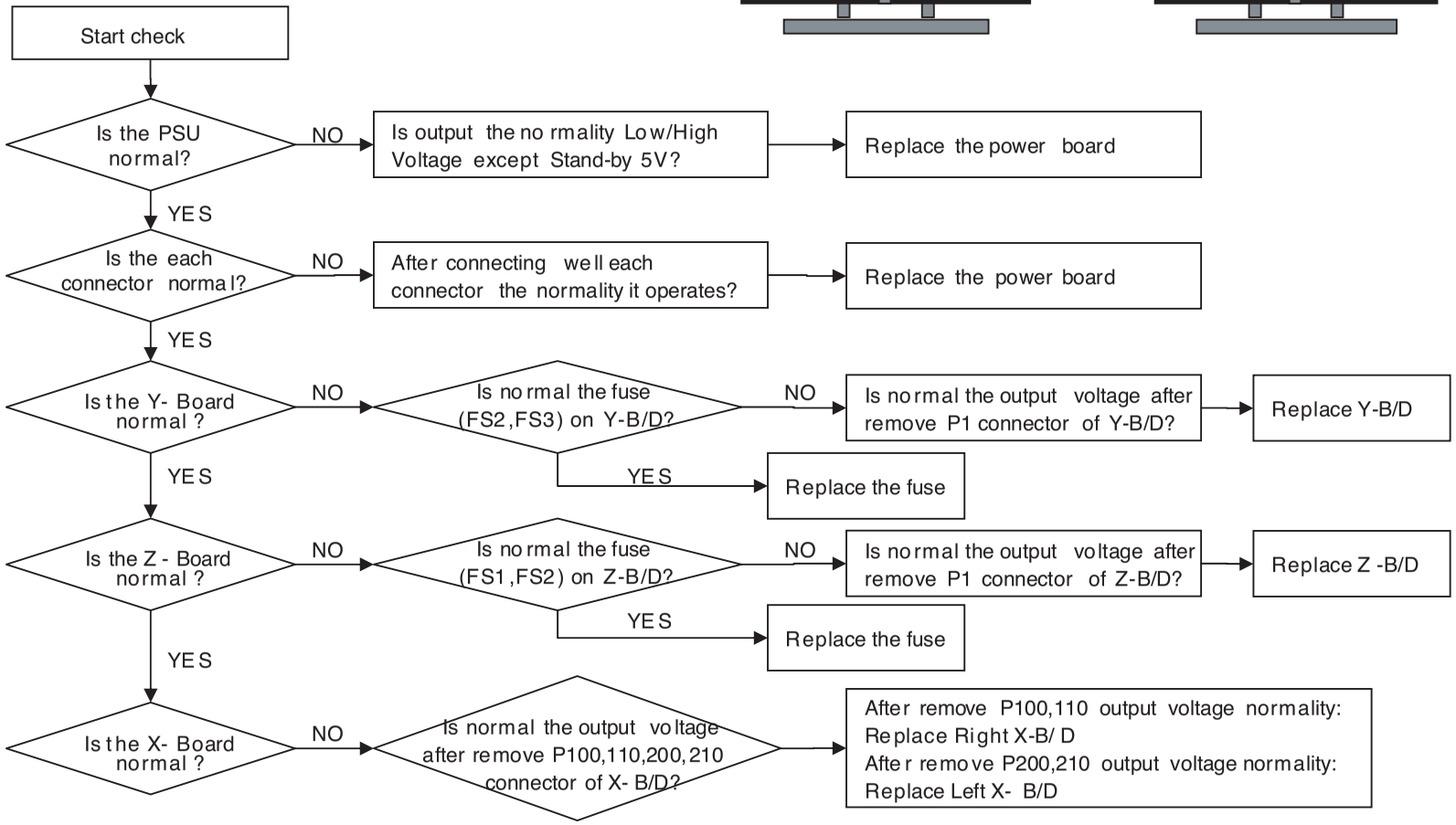
◆ Symptom

1) After once shining, it doesn't discharge minutely from module.

2) The relay falls. (The sound is audible "Click")

3) It is converted with the color where the front LED is red from green.




Start check
Is the PSU normal?
NO
Is output the no rmality Low/High Voltage except Stand-by 5V?
Replace the power board
YES
Is the each connector normal?
NO
After connecting well each connector the normality it operates?
Replace the power board
YES
Is the Y- Board normal ?
NO
Is no rmal the fuse (FS2,FS3) on Y-B/D?
NO
Is no rmal the output voltage after remove P1 connector of Y-B/D?
Replace Y-B/D
YES
Replace the fuse
YES
Is the Z - Board normal ?
NO
Is no rmal the fuse (FS1,FS2) on Z-B/D?
NO
Is no rmal the output voltage after remove P1 connector of Z-B/D?
Replace Z -B/D
YES
Replace the fuse
YES
Is the X- Board normal ?
NO
Is normal the output voltage after remove P100,110,200,210 connector of X- B/D?
After remove P100,110 output voltage normality: Replace Right X-B/ D
After remove P200,210 output voltage normality: Replace Left X- B/D

LGE Internal Use Only

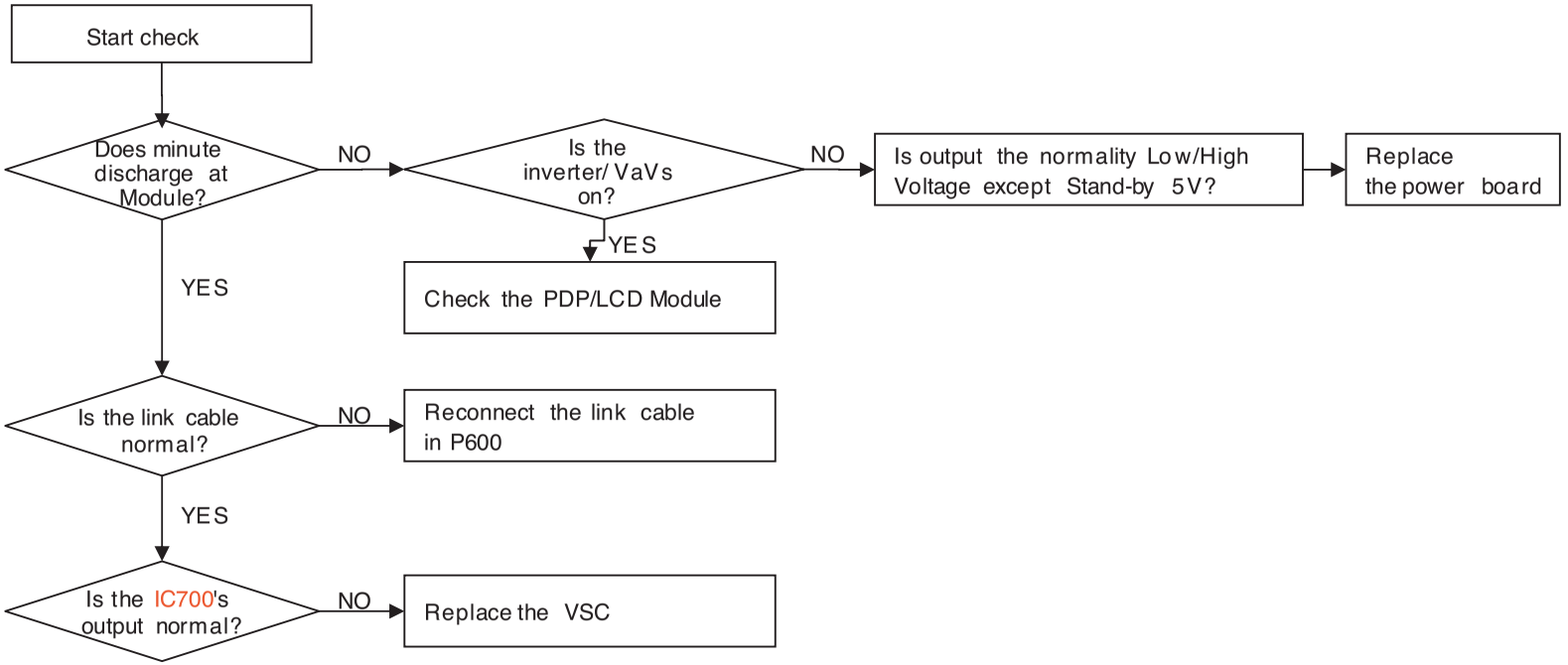
Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

3. No Raster

◆ Symptom

1) No OSD and image occur at screen.

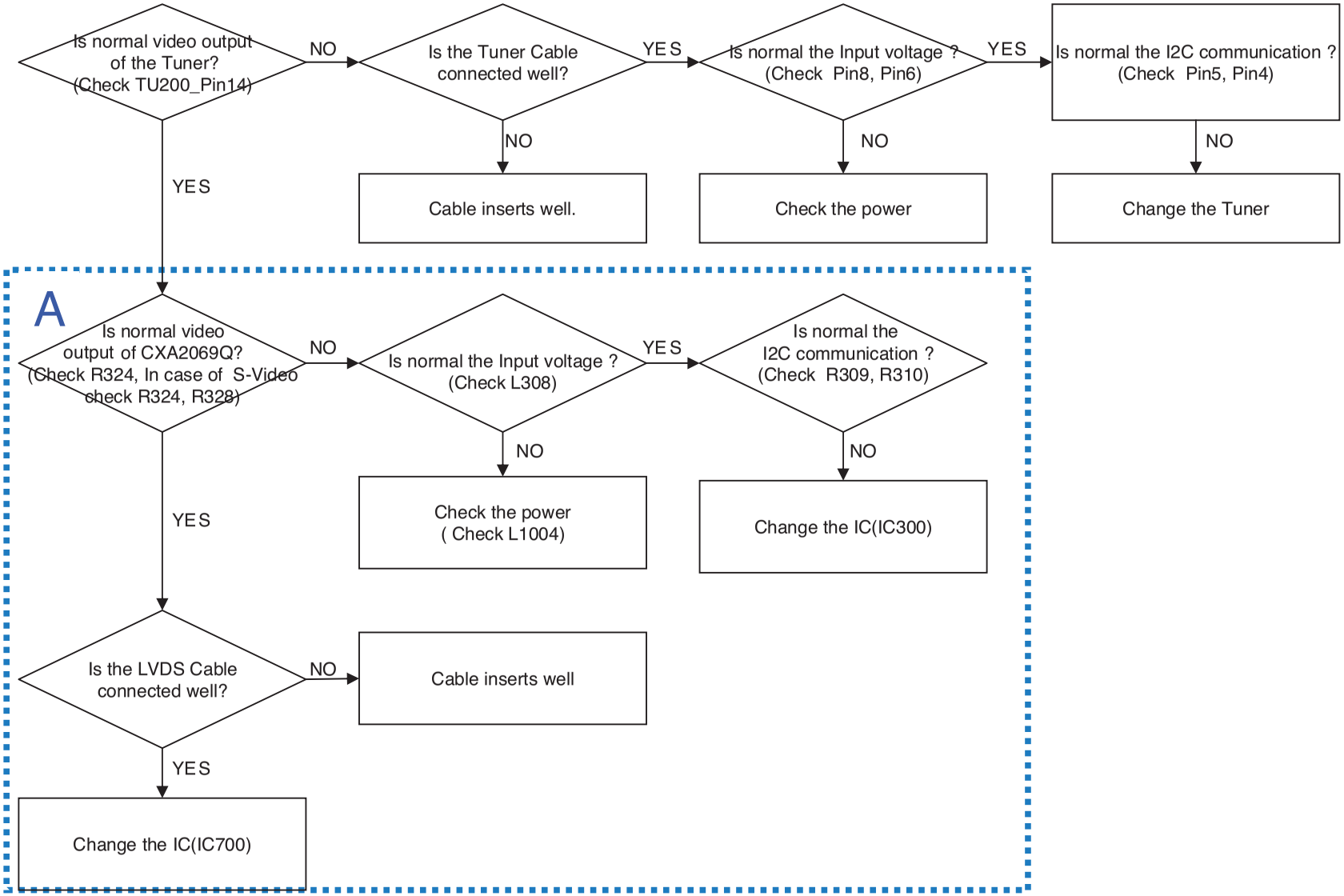
2) It maintains the condition where the front LED is green



LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

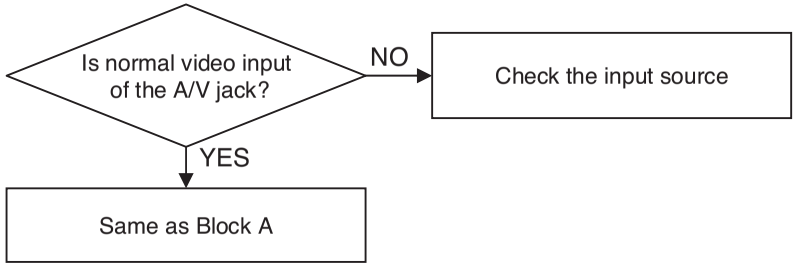
4. In case of becomes unusual displayfrom RF mode(Main)



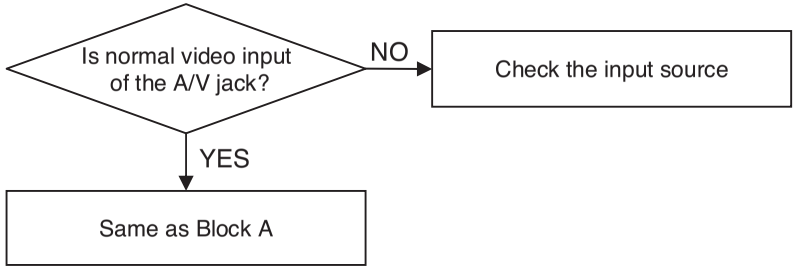
LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

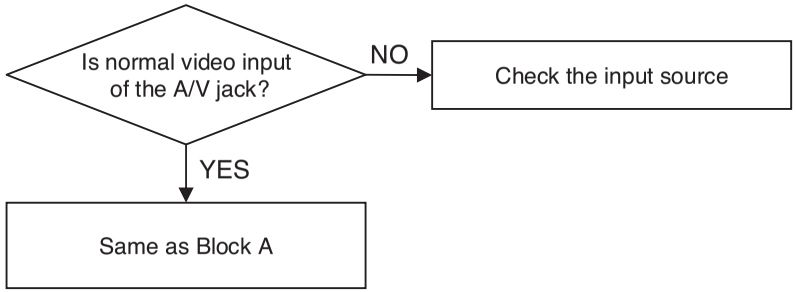
5. In the case of becomes unusual display from rear AV mode(main)



6. In the case of becomes unusual display from rear S-Video mode(main)



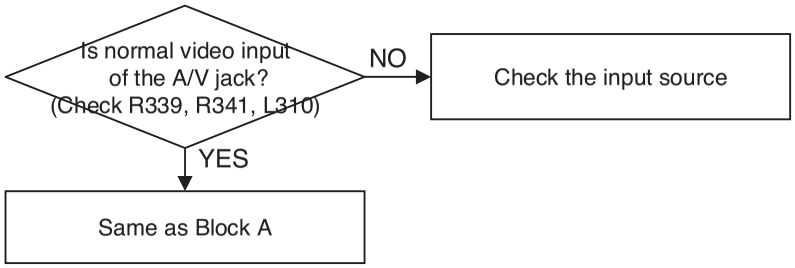
7. In the case of becomes unusual display from side AV mode(main)



LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

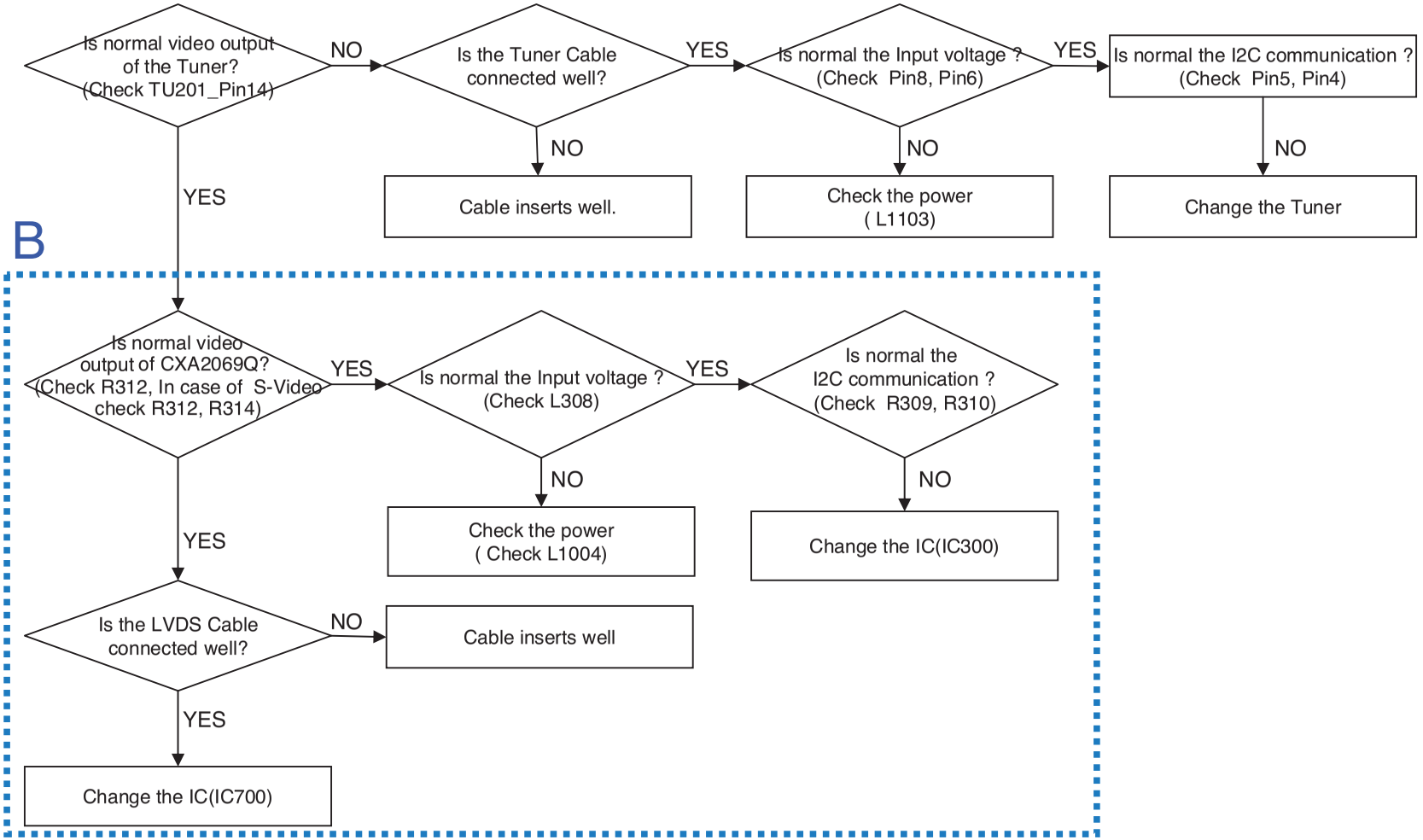
8. In the case of becomes unusual display from side S-Video mode(main)



LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

13. In case of becomes unusual display from RF mode(Sub)



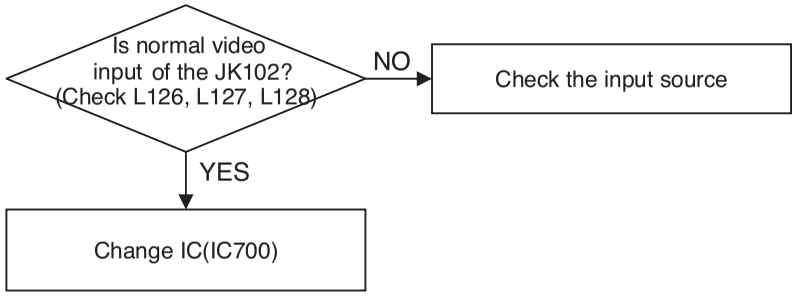
14. In case PIP doesn't display from other modes(Sub)

Same as the case of main except block A should be change to B

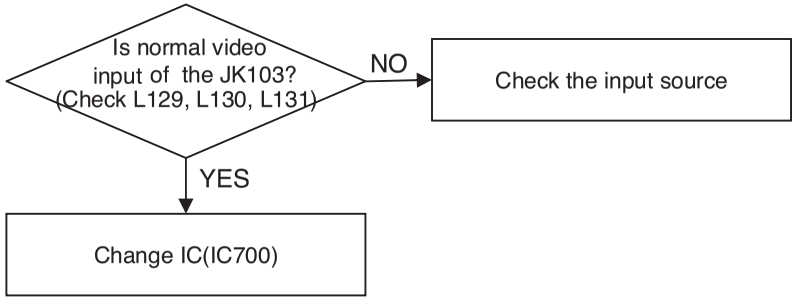
LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

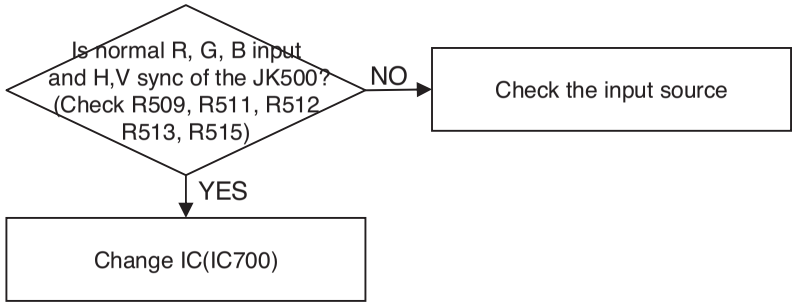
15. In case of becomes unusual display from component1 mode(main/sub)



16. In case of becomes unusual display from component 2 mode(main/sub)



17. In case of becomes unusual display from RGB mode(main/sub)



LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

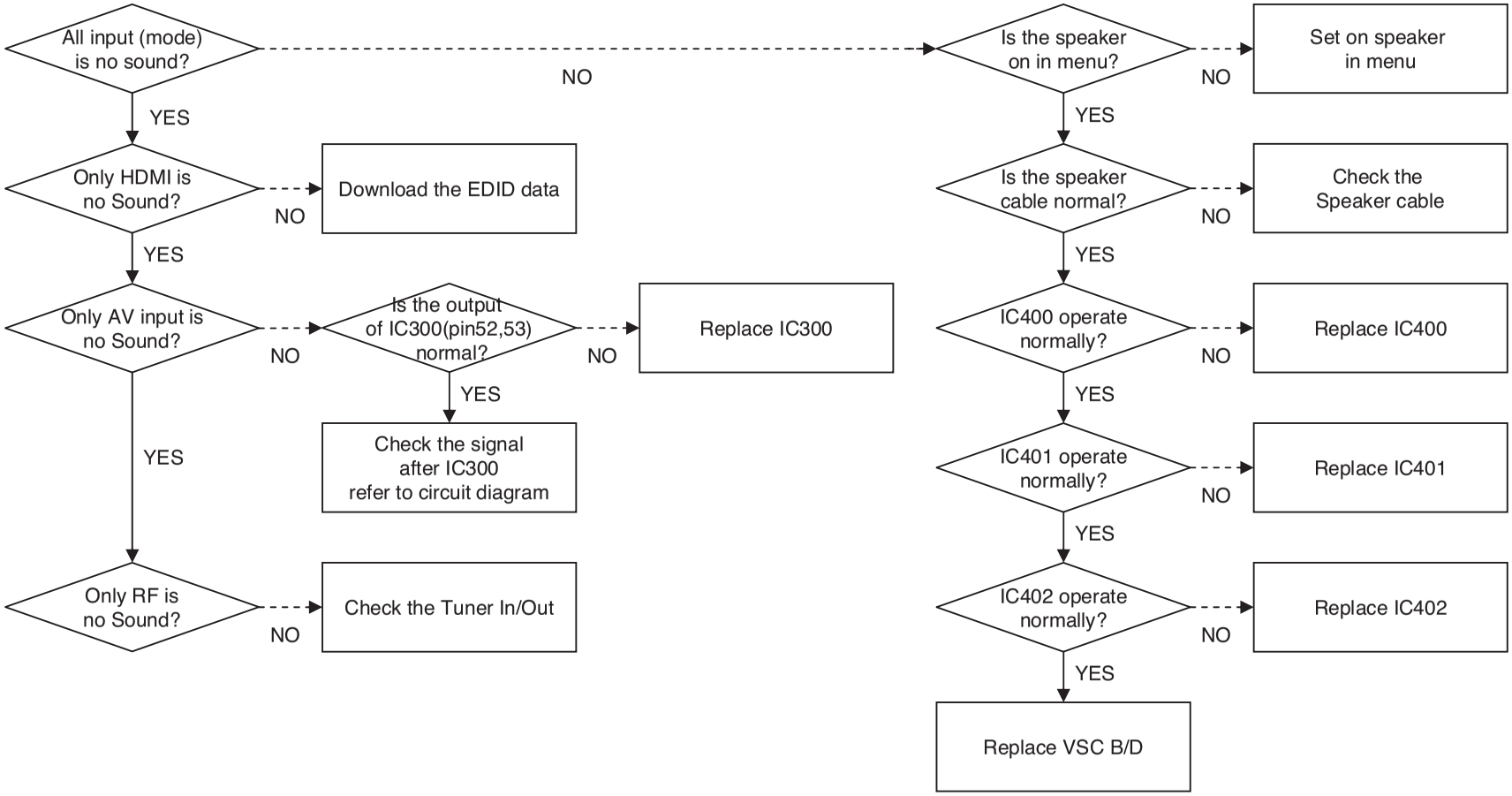
18. No Sound

- Symptom

  LED is Green

  Screen is existent, but sound isn't

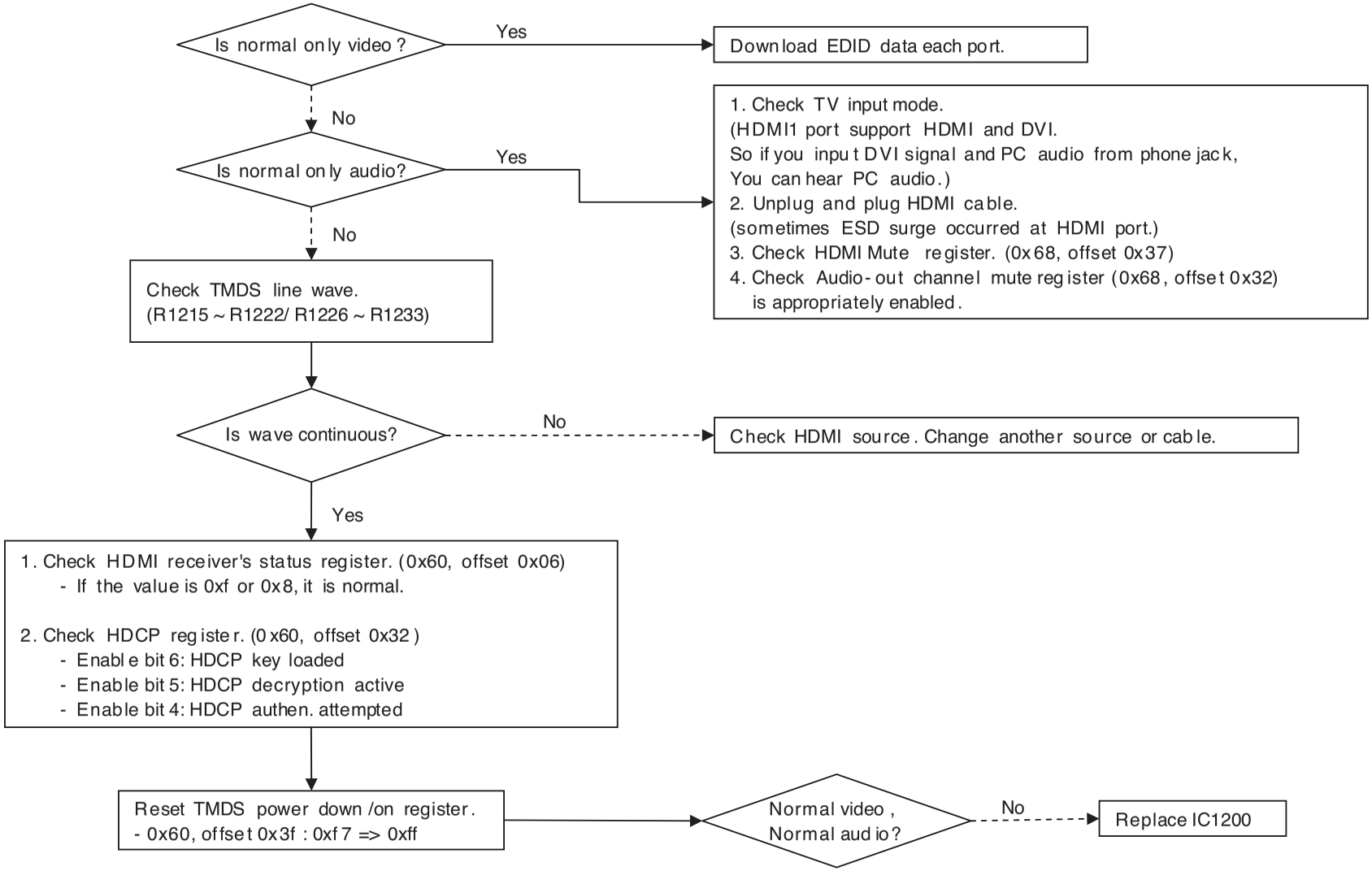
- Check follow



LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

19. HDMI mode


Is normal only video ?
Yes
Download EDID data each port.
No
Is normal only audio?
Yes
1. Check TV input mode.
(HDMI1 port support HDMI and DVI.
So if you input DVI signal and PC audio from phone jack,
You can hear PC audio.)
2. Unplug and plug HDMI cable.
(sometimes ESD surge occurred at HDMI port.)
3. Check HDMI Mute register. (0x68, offset 0x37)
4. Check Audio-out channel mute register (0x68, offset 0x32)
is appropriately enabled.
No
Check TMDS line wave.
(R1215 ~ R1222/ R1226 ~ R1233)
Is wave continuous?
No
Check HDMI source. Change another source or cable.
Yes
1. Check HDMI receiver's status register. (0x60, offset 0x06)
- If the value is 0xf or 0x8, it is normal.
2. Check HDCP register. (0x60, offset 0x32)
- Enable bit 6: HDCP key loaded
- Enable bit 5: HDCP decryption active
- Enable bit 4: HDCP authen. attempted
Reset TMDS power down/on register.
- 0x60, offset 0x3f : 0xf7 => 0xff
Normal video,
Normal audio?
No
Replace IC1200

LGE Internal Use Only

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

20.1 DVR

◆ Symptom

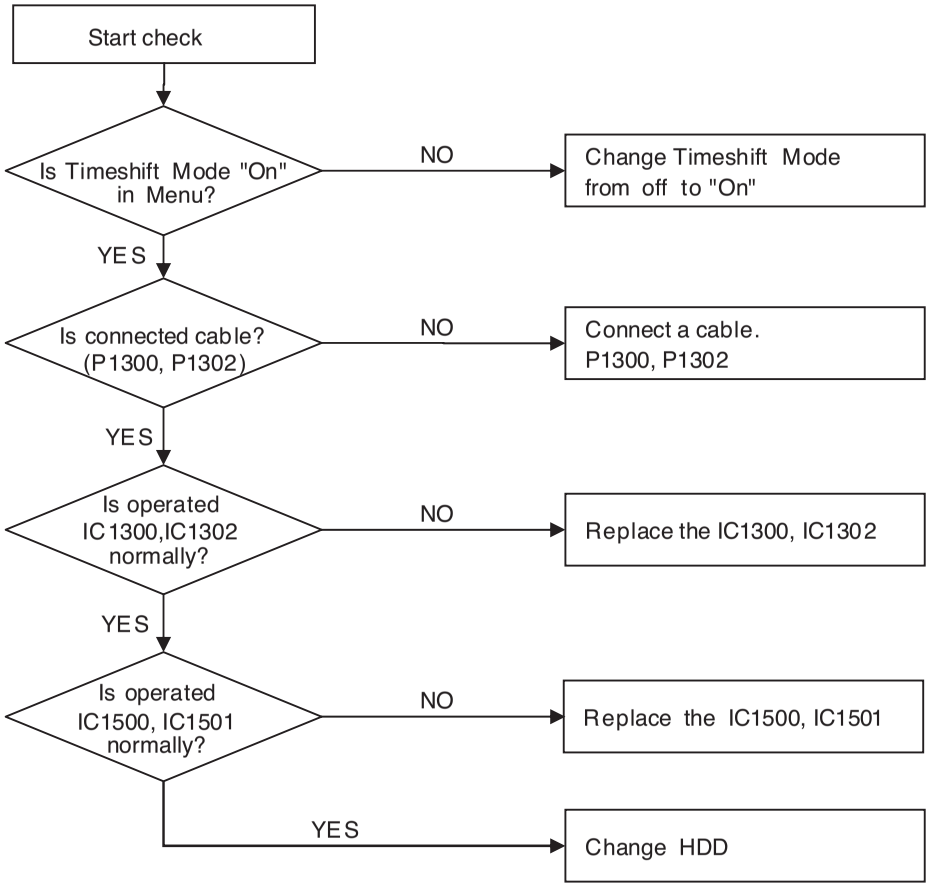
LED is Green

Doesn't work timeshift mode.

Can't enter to recorded list

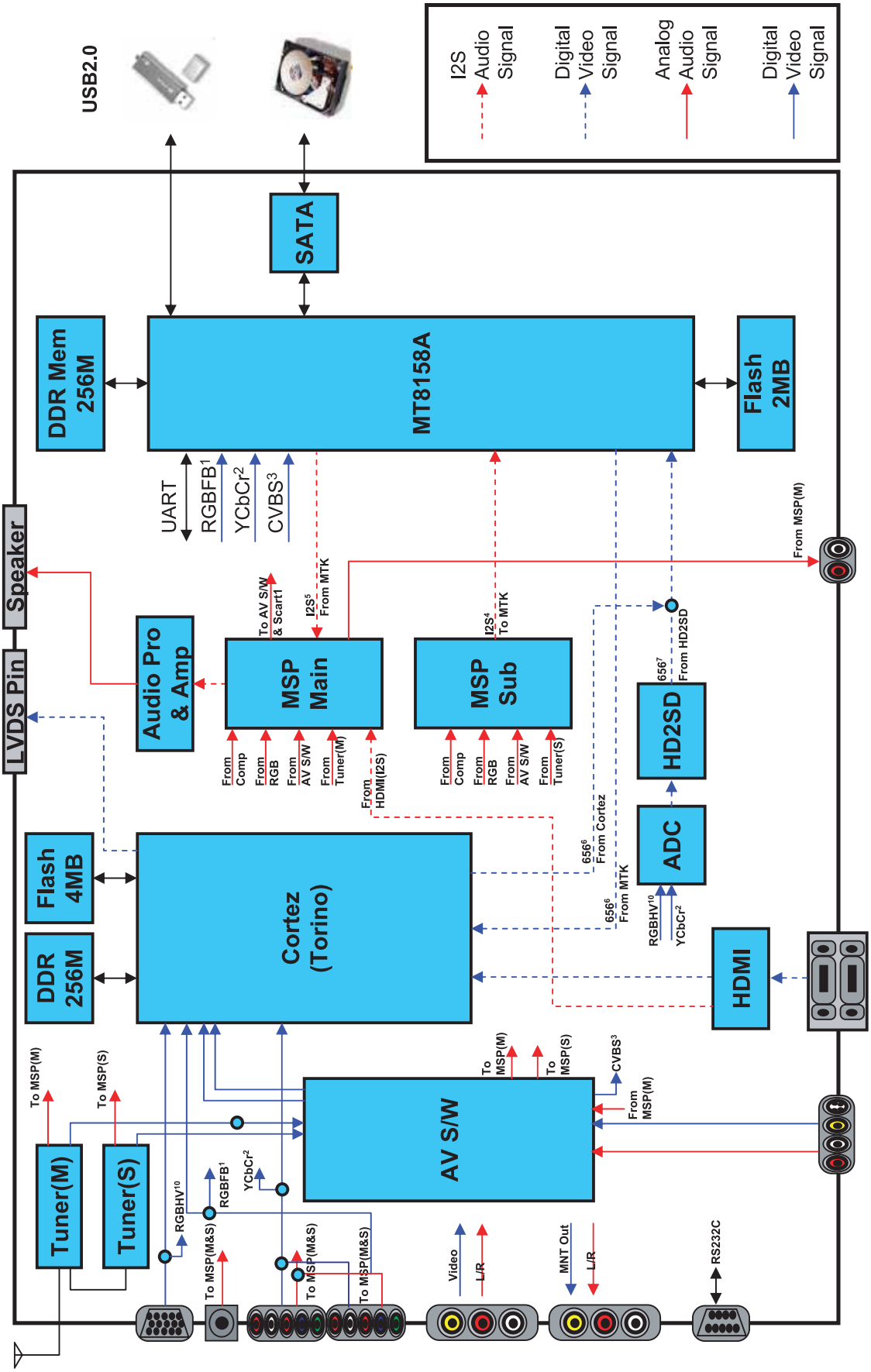
Can't record AV/RF/Component

◆ Check follow



LGE Internal Use Only

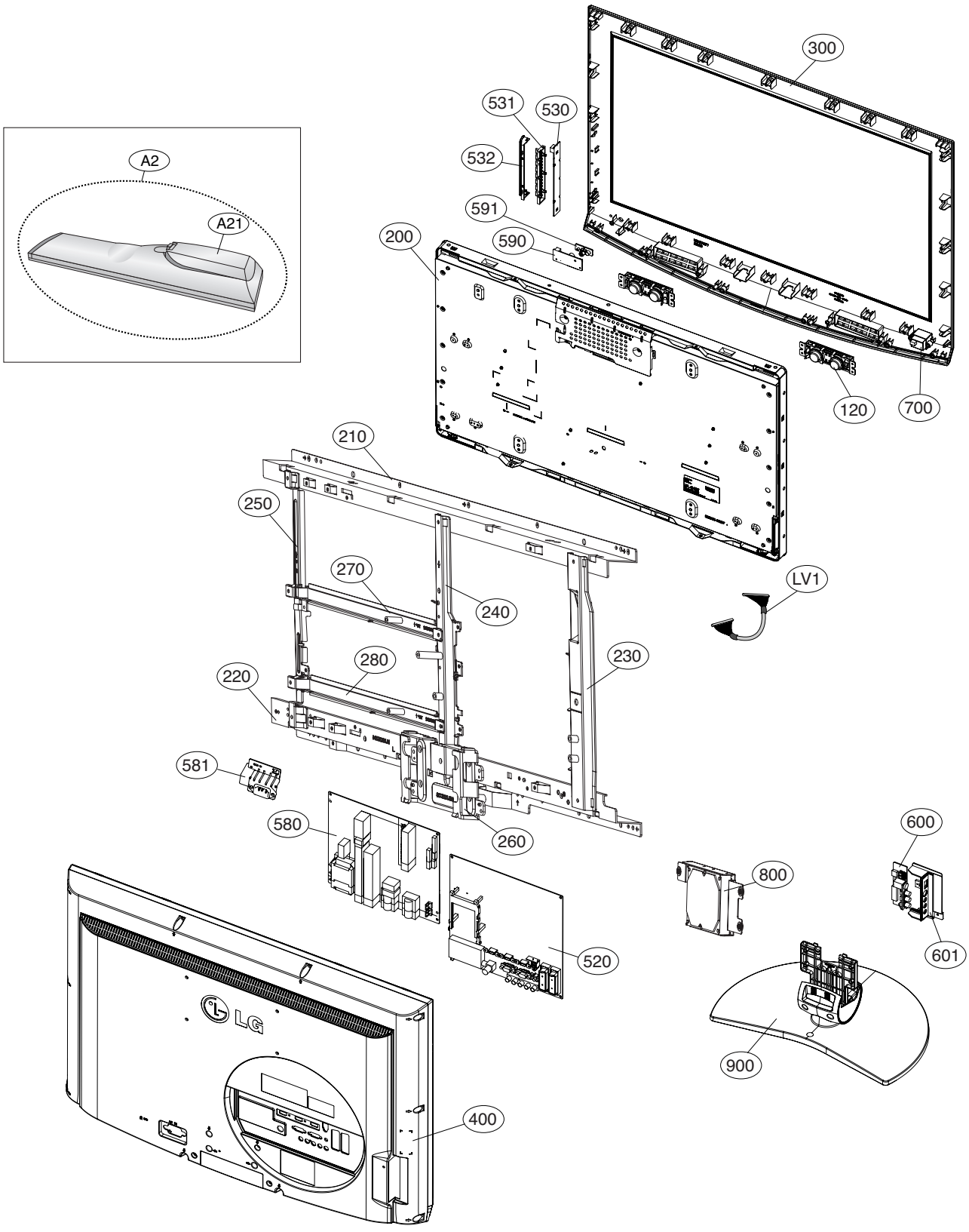
BLOCK DIAGRAM



Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

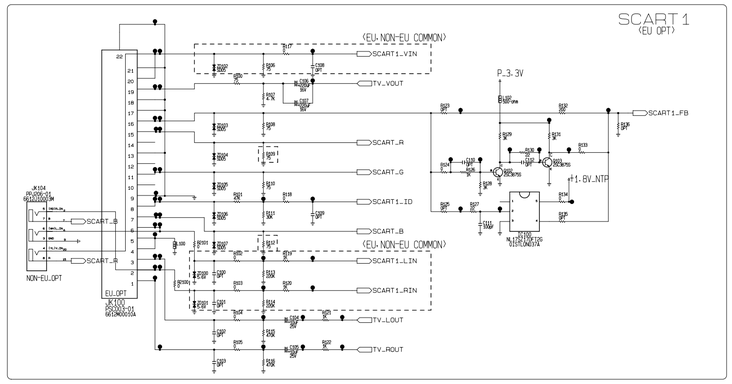
EXPLODED VIEW

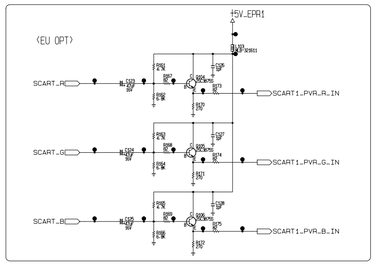


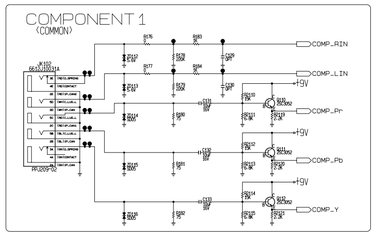
Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

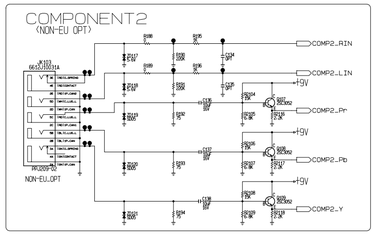
LGE Internal Use Only

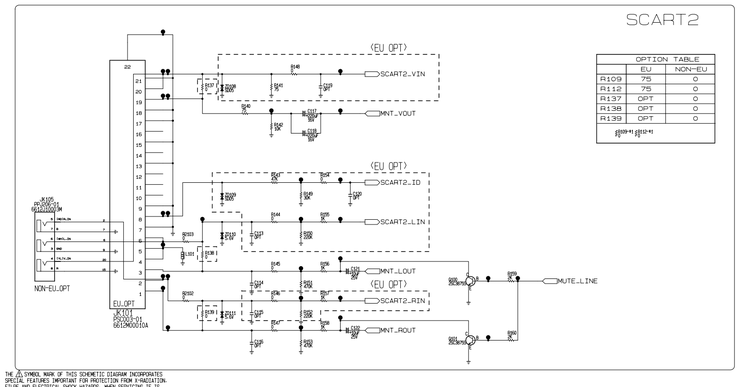
1. SCART & COMPONENT









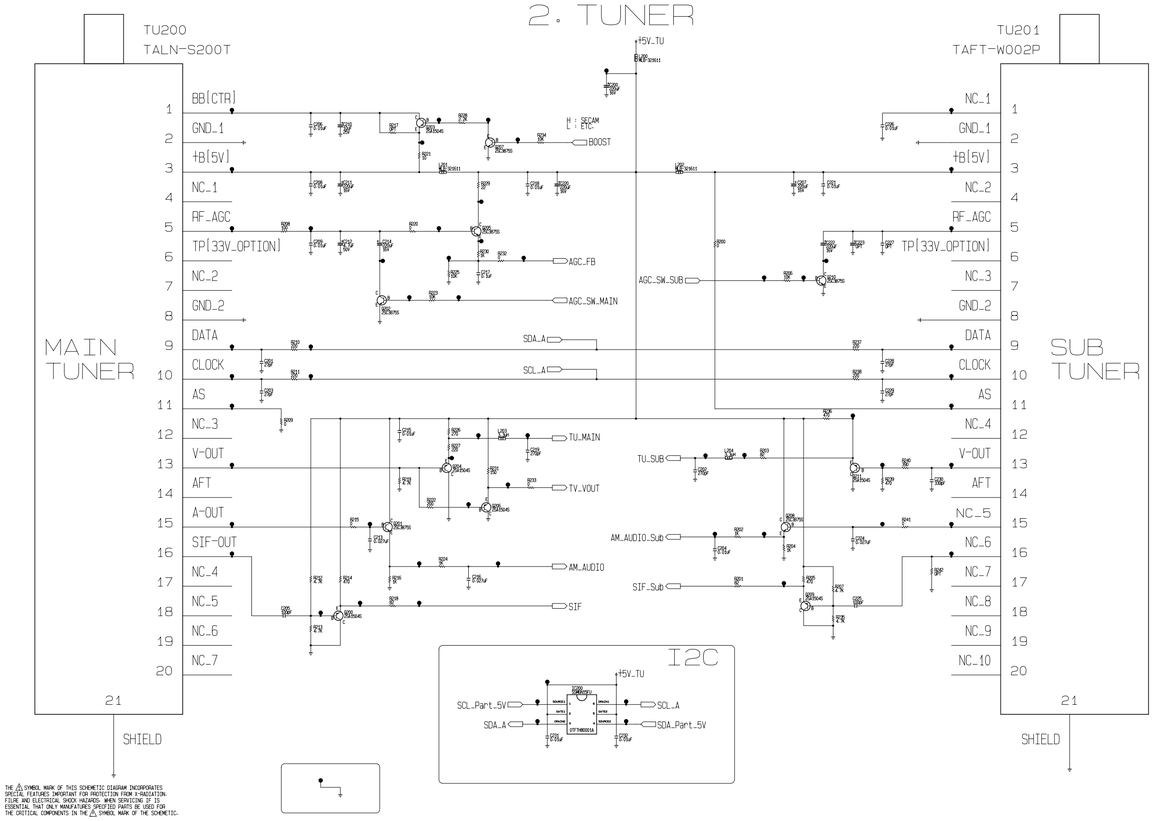


OPTION TABLE		
	EU	NON-EU
R109	75	0
R112	75	0
R137	OPT	0
R138	OPT	0
R139	OPT	0

R109*1 R112*1

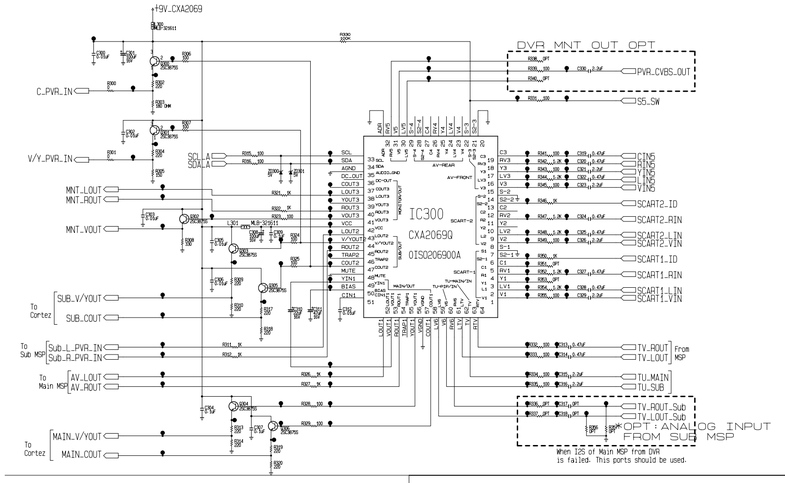
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FLIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

2. TUNER

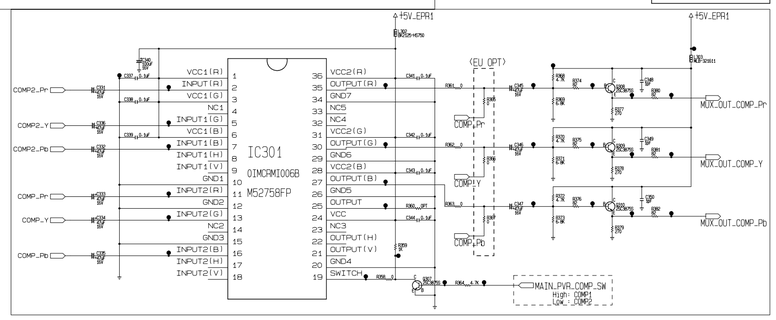


THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FLIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

3. VIDEO SW

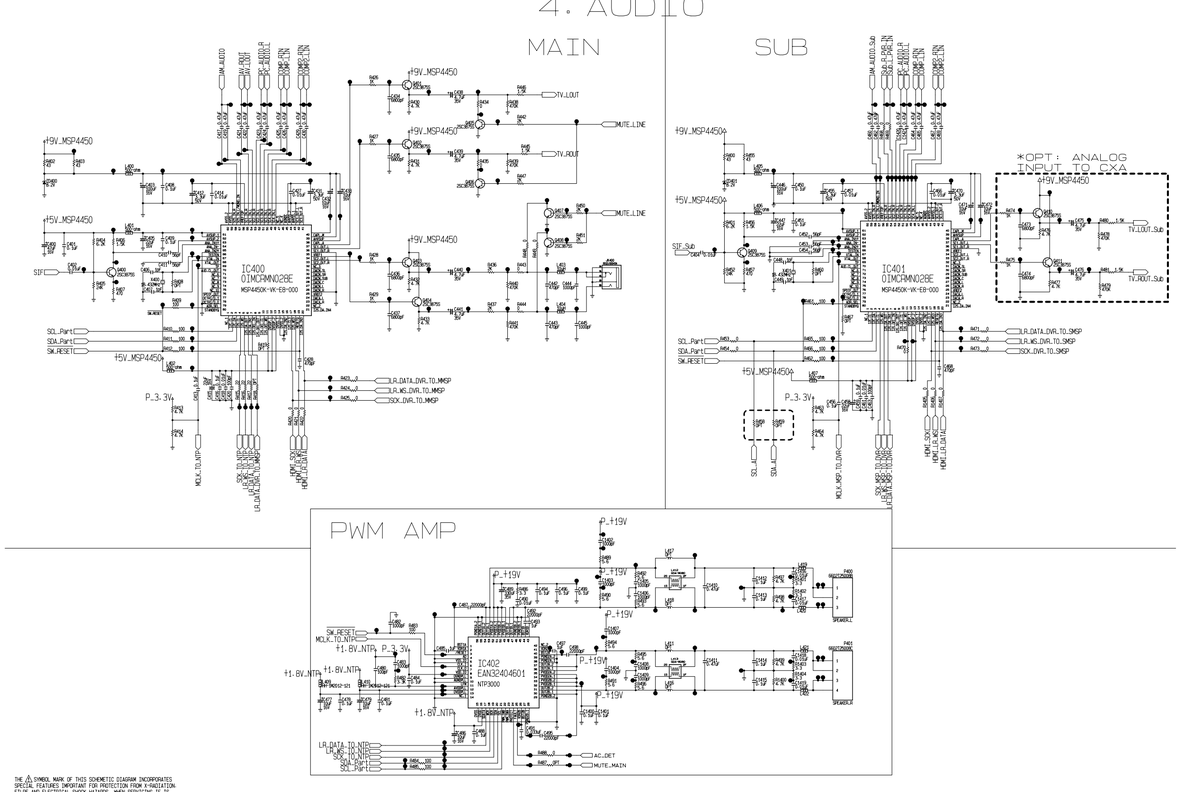


OPTION TABLE		
	EU	NON-EU
R361	OPT	0
R362	OPT	0
R363	OPT	0
R365	0	OPT
R366	0	OPT
R367	0	OPT



THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FLIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

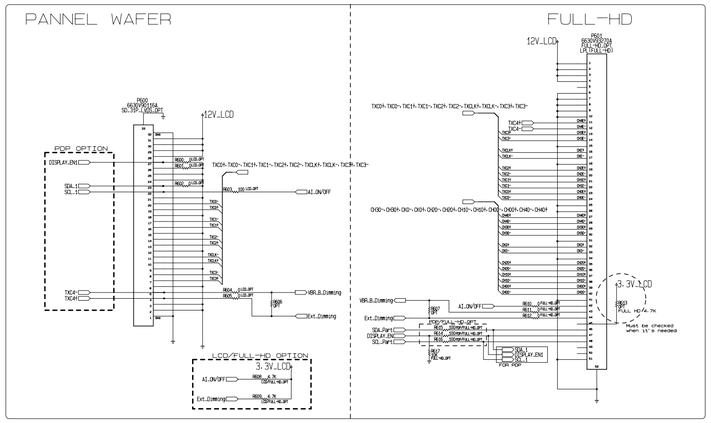
4. AUDIO

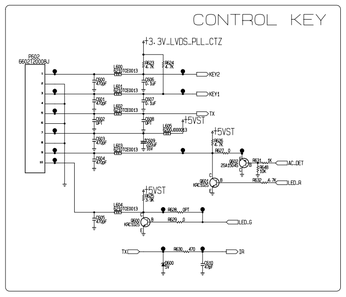


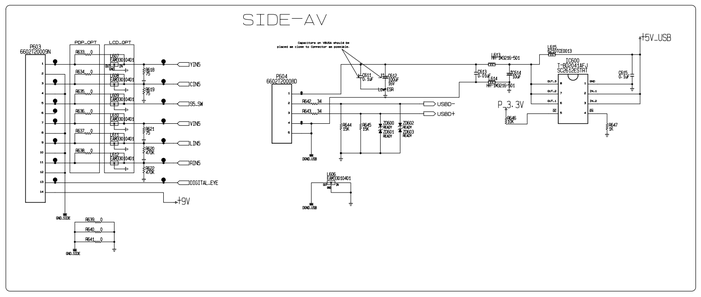
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FLIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

6. LVDS&CONTROL&SIDE AV

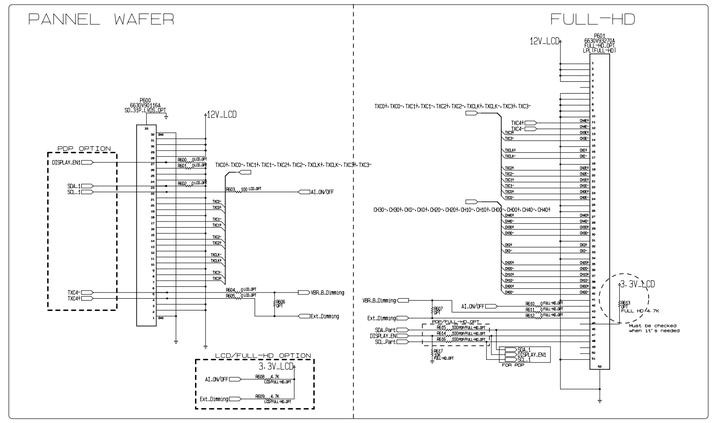


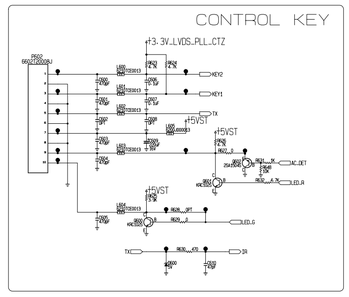


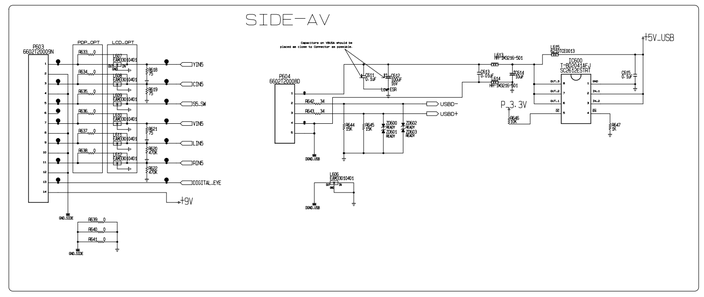


THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FLUE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

6. LVDS&CONTROL&SIDE AV

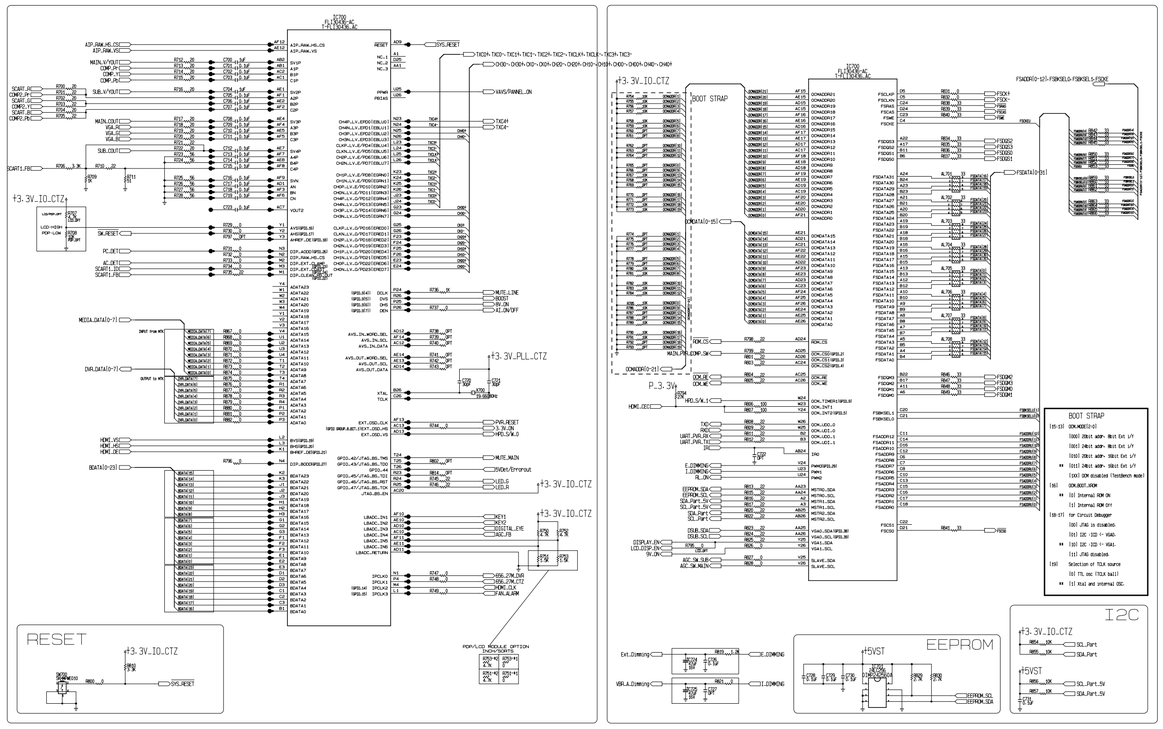




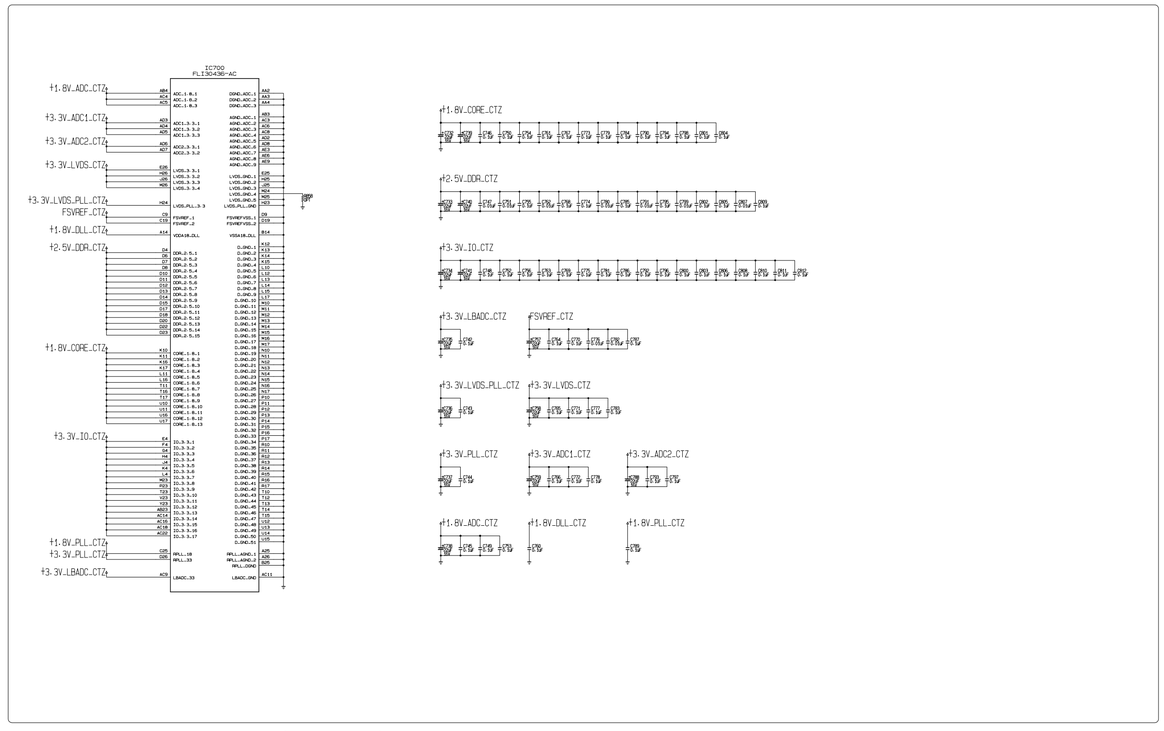


THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FLUE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

7. TORINO_FLI30436_I/O



8. TORINO_FLI30436_Power

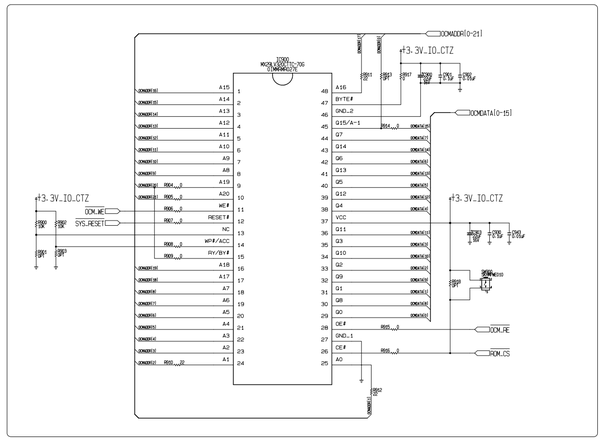


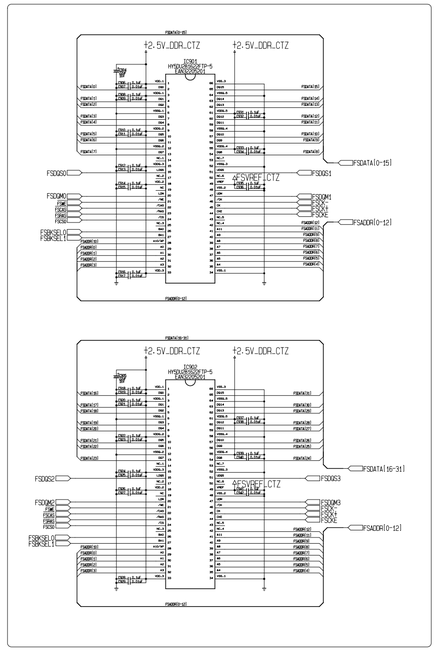
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FLUE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

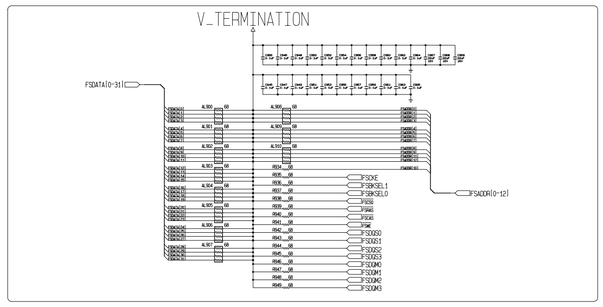
Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

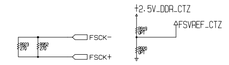
LGE Internal Use Only

9. FLASH & DDR MEMORY



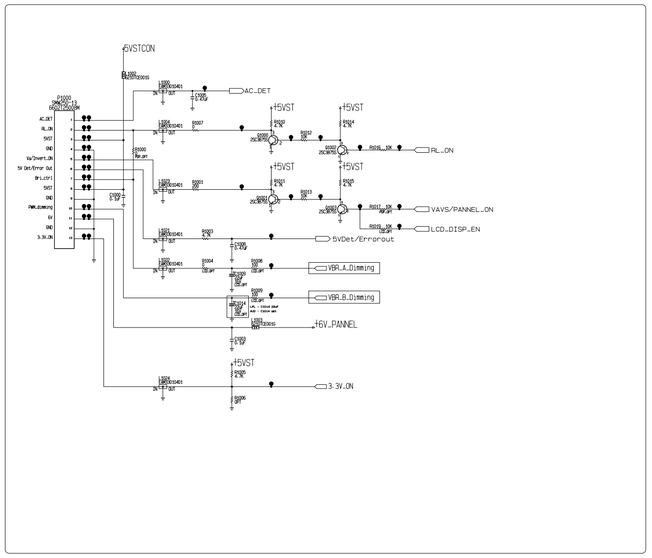


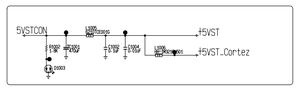


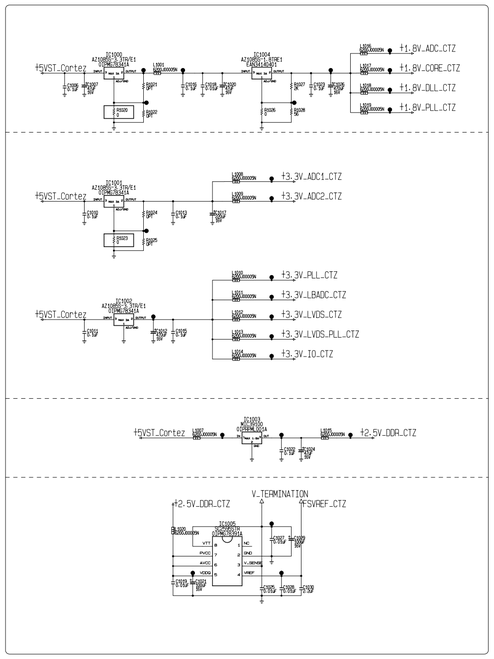


THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIURE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING SF IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

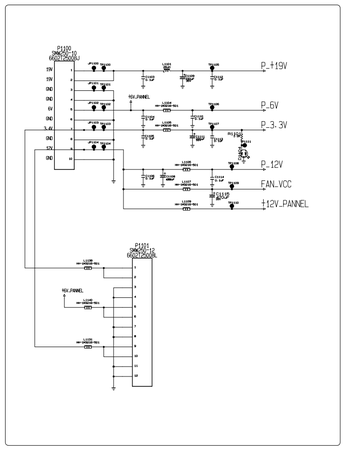
10. POWER_STANDBY

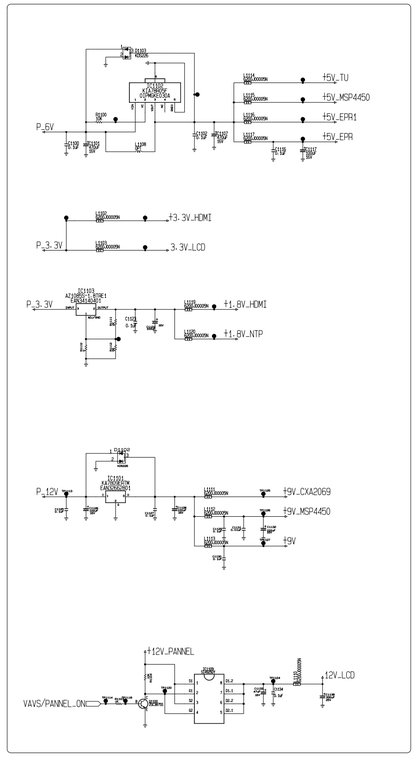


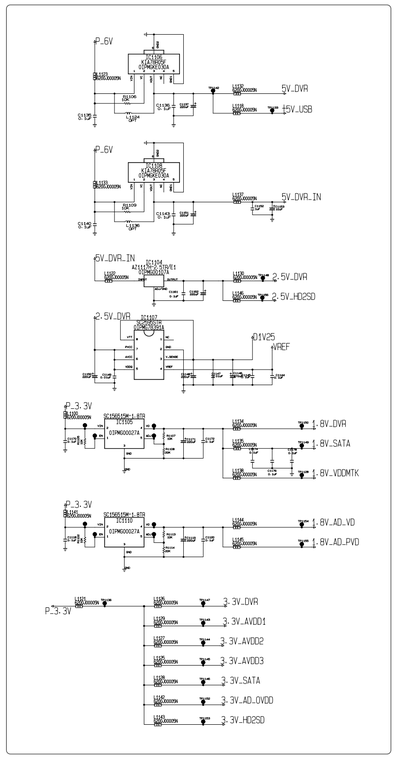




11. POWER_MULTI



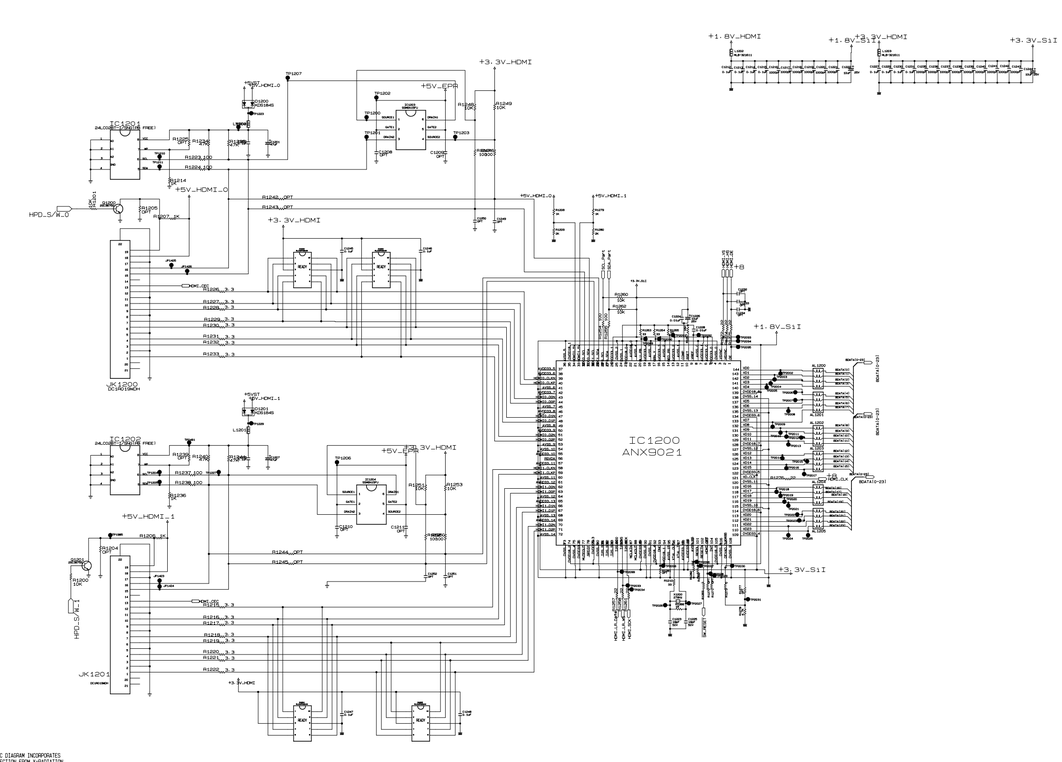




SATURN (Analog DVR)

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIURE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING SF IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

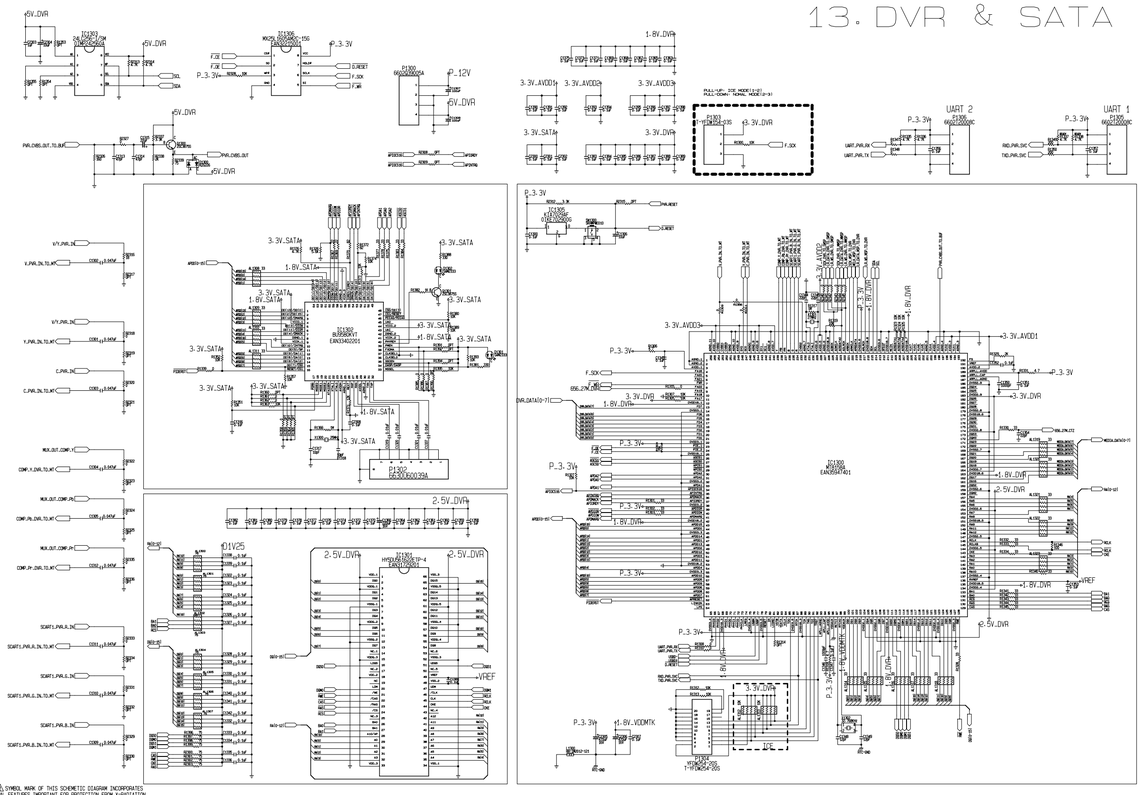
12. HDMI

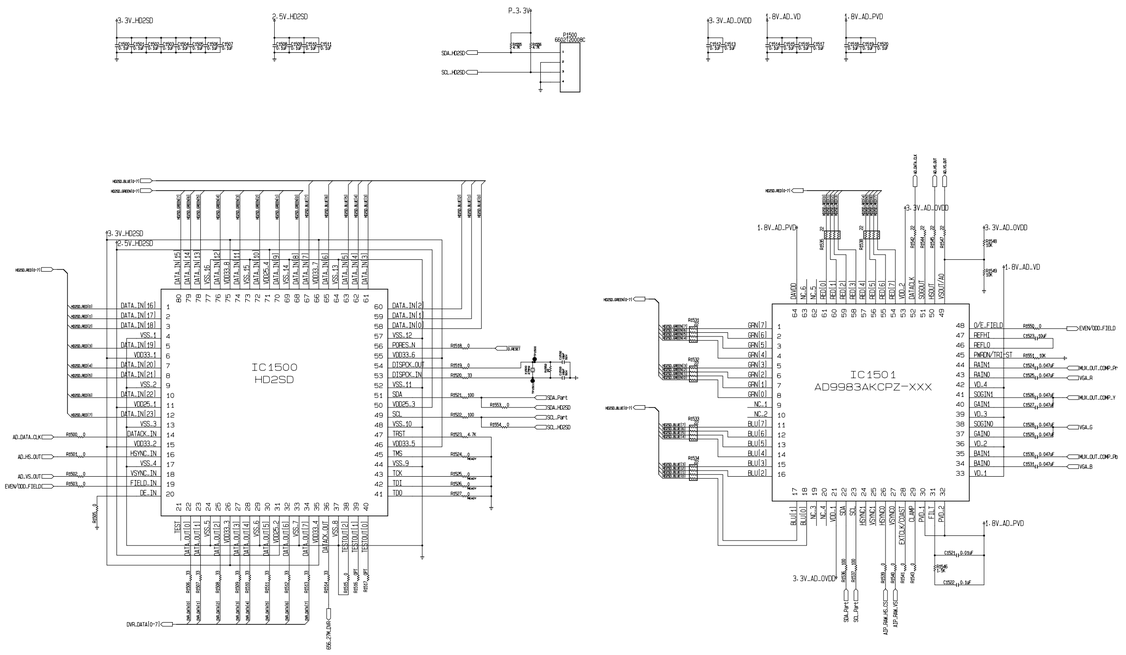


Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only

13. DVR & SATA





THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FIURE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFATURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

Copyright © 2007 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LG Electronics Inc.

P/NO : MFL39106202

Aug., 2007
Printed in Korea